

The Nociceptive Blink Reflex in Migraine:

An investigation of endogenous and exogenous modulators on the trigeminal nervous system in migraine sufferers.

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This thesis is presented for the degree of

Doctor of Philosophy

School of Psychology and Exercise Science, Murdoch University

Western Australia

2013

Declaration

I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution.

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Abstract

The purpose of this thesis was to determine whether the blink reflex in response to a supraorbital electrical stimulus was a useful marker of activity in central and peripheral nociceptive processing pathways during and between attacks of migraine. In particular, the blink reflex was used to assess trigeminal nociceptive activity in migraine sufferers and to investigate the influence of various exogenous and endogenous modulators on this reflex. It was hypothesized that migraine sufferers would be subjectively and physiologically hypersensitive to both environmental (exogenous) and internal (endogenous) factors. This hypersensitivity was investigated both through subjective ratings and physiologically with blink reflex parameters in response to trigeminal stimulation with and without administration of a noxious compound (ingestion of hypertonic saline) and various environmental stimuli (light, heterosegmental cold pain). Topical application of a local anaesthetic agent inhibited the nociceptive blink reflex measured in response to a concentric electrode stimulus in healthy controls. However, in headache-free migraine sufferers, the nociceptive blink reflex was less likely to be affected by the local anaesthetic. Migraineurs and controls were equally susceptible to peripherally induced nausea evoked by the ingestion of hypertonic saline. However, nausea increased headache and scalp tenderness in all participants, and trigeminal irritation increased headache. Migraine did not affect any blink reflex parameters evoked by a weak electrical stimulus to the forehead. However, symptoms of migraine, scalp tenderness and painfulness of conditioning stimuli were all rated as more intense during a migraine attack, suggesting that temporal summation of trigeminal nociceptive stimulation evoked supraspinal central sensitisation. Whilst there was some evidence of interictal sensitisation in migraine sufferers, this would be better investigated with test stimuli that strongly activate nociceptive afferent fibres in terms of spatial and temporal summation.

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Acknowledgements

The completion of this thesis would not have been possible without the academic support, guidance, help and patience of my Ph D supervisor and mentor Professor Peter Drummond. I would like to thank him for his expert scientific leadership and his knowledge that has shaped me as researcher. I will miss the mentor-student relationship that has developed over the years of working together and hope that it will transpire into a collaborative partnership in future years. I would also like thank Professor Drummond for giving me a fantastic opportunity and enlightening me to research.

I would sincerely like to thank the organisations that financially supported the research. This research was financially supported by the NHMRC and the UK Migraine Trust. Without financial aid from organisations such as these, research would not occur. Thank You.

I would also like to thank the staff within the School of Psychology, especially the Technicians (Man, Francis & David). Due to the technical calibre of this research, it would not have been possible without their expert technical assistance. Additionally, I am grateful for the fantastic help from Cath who chaperoned and assisted me during the migraine testing sessions which included being called upon with no notice. I would also like to thank my two informal proof-readers, Reece and Brendan, who diligently ticked and crossed and highlighted their way through my thesis draft.

I would also like to sincerely acknowledge the role of all participants that completed the research. None of the studies were a pleasant experience especially when participants volunteered themselves during a migraine attack. These altruistic people sacrificed their comfort and time during an episode of debilitating illness, without medication, to be studied in the name of science which left me in awe of their participation.

During my candidature I have had the privilege of sharing the Lab with many inspiring and intelligent colleagues including Kylie, Bruce, Ashley, Anna CG, Dean and Juanita. I have also shared my Ph D journey with other candidates that have eased the burden with support, help, conversation, hugs, encouragement, writing groups, coffee and wine including Nat, Heather, Clare, Kate, Darren, Hayley, Anna and Jen J. Thanks also to Duane & Steve from ITRI for the continuing support.

I am also very thankful for the efforts from the team at Thinkwell (Maria Gardiner and Hugh Kearns) who helped getting the final write-up over the line. This task however would not have been completed without the very much appreciated thesis whispering of Cecily Scutt.

My final but far from least heart-felt thanks go to my family and friends. My family has expanded over my candidature but we have also experienced loss with my Dad passing away earlier in my candidature. I know he would have been proud, if nothing else but for my perseverance. My husband Stu and children Zach and Sophie gave my life another purpose other than the research, and continued to give me love, hope and encouragement throughout this amazing journey. My Mum and sisters also deserve a thank you for keeping my feet firmly on the ground and ensuring I see the lighter and funnier side of life. My parents-in-law Mai and Hugh, also helped out emotionally and financially throughout my candidature for which I am very grateful. I am very grateful to my special friends Jacquie (who kept me sane with coffee, shopping and conversation) and Trina (who helped me out with my formatting and encouraged me to persevere).

What an amazing journey!